



U.S. Army Tank-automotive and Armaments Command

***U.S. Army Armament Research,
Development
And Engineering Center***

Picatinny Arsenal, NJ 07606-5000



Reclaimed and Virgin TNT Qualification Requirements

presented at
The TNT Pre-Proposal Conference
Bettendorf, Iowa
20 March 2003

by
Mr. Curtis Anderson, Jr.
Armament Systems Process
Division



Outline

- *Background*
- *Qualification Requirements*
 - ✓ *Reclaimed TNT*
 - ✓ *Virgin TNT*
- *Summary*

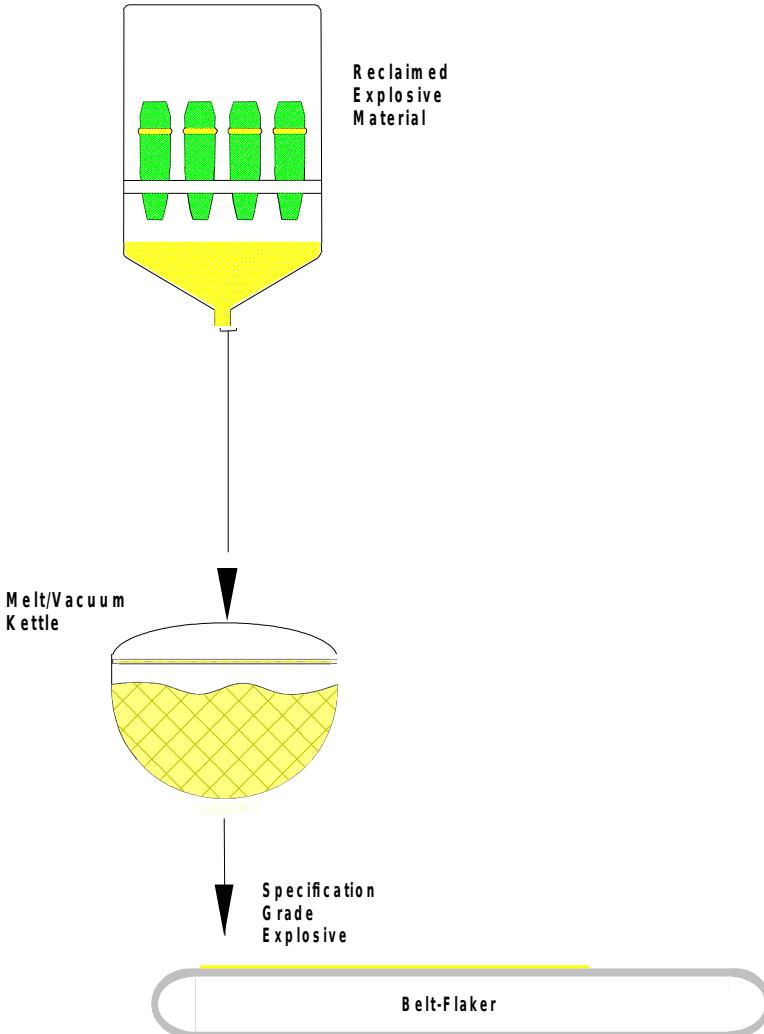


Background Reclaimed TNT

- ✓ *To date, a total of 8.69M pounds of TNT have been reclaimed from 8-inch artillery projectiles*
 - *Product is classified as Type III TNT in accordance with MIL-DTL-248D*
 - *Downloading Process - Autoclave*
- ✓ *6.34M pounds have been qualified for re-use*
 - *2.7M pounds loaded in new bomb production*
- ✓ *The loading process for artillery*



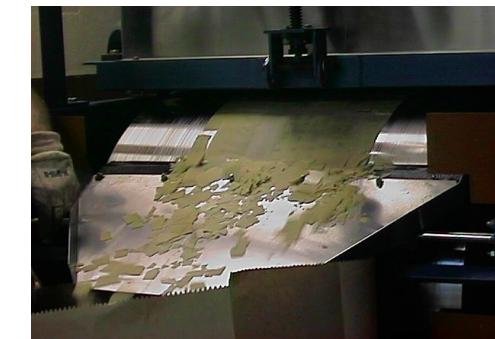
Background Autoclave Process



- *Projectiles loaded into autoclave*



- *Molten TNT flows into kettle*
- *Explosive is flaked to specification thickness*





Reclaimed TNT Qualification Requirements

- *Three 50-pound composite samples shall be used for first article qualification of reclaimed TNT not meeting the literal definition of Type III in MIL-DTL-248D*
 - *Composite sample shall be made up with samples collected from multiple production dates.*
 - *Sampling frequency on a given production day, shall be one 5-pound sample taken approximately 30 minutes after start-up of flaking operations and another 5-pound sample, approximately 30 minutes prior to shutdown*
- *The composite samples shall be subjected to all testing requirements for Type III per MIL-DTL-248D*



Requirements for Reclaimed TNT Qualification Requirements

- *In addition, if the reclaimed TNT does not meet the literal definition of Type III, the composite samples shall also be subjected to testing for compatibility with the internal components of the munitions items, e.g., body, paint, coating, steel tubing, gasket, etc.*
- *Tests shall be conducted by a U.S. Government DoD explosive laboratory, and standard (virgin) TNT material shall be used as control samples*
- *Test results shall be submitted to TACOM-ARDEC for review with final approval to proceed with full-scale production provided by the procurement contracting officer*
- *Above testing and sampling requirements remain in effect even in the full-scale production*



Virgin TNT Qualification Requirements

- ***Three 50-pound samples from actual production runs shall be used for qualification (first article)***
 - ***Sample shall be collected on different days (or a different week)***
- ***In addition to the the chemical and physical tests for Type I TNT as specified in MIL-DTL-248D, samples shall be tested for:***
 - ***ERL, Type 12 Impact test***
 - ***ABL Friction sensitivity test***
 - ***Vacuum thermal stability test***
 - ***Large scale gap test***
 - ***Detonation velocity***



Virgin TNT Qualification Requirements

- *All tests shall be conducted by A U.S. Government DoD explosive laboratory, and standard (virgin) TNT material shall be used as control samples*
- *Test results shall be submitted to TACOM-ARDEC for review with final approval to proceed with full-scale production provided by the procurement contracting officer*



Virgin TNT Qualification Requirements

- **Typical Ranges for Virgin TNT**

	Impact ERL (cm)	Friction ABL (psi)	VTS (ml/5g)	LSGT (in), Density (g/ml)	Detonation Velocity (km/s)
Control (RAD-7-0587)	66.2 ± 0.7	1,800	0.15	1.37 $\rho = 1.58$	Avg. = 6.96
	45.1 ± 2.6	1,800	0.18	1.40 $\rho = 1.592$	Avg. = 6.57



Summary

- ✓ ***Reclaimed TNT (Type III)***
 - ***Meets MIL-DTL-248D Requirements***
 - ***Being Used in the Production of Bombs***
- ✓ ***Qualification Requirements - Straightforward***
- ✓ ***In Normal Production Mode, Testing Requirements for Reclaimed TNT Are More Stringent Than Those for Virgin TNT***